

**IN THE CLAIMS:**

Please amend claims 1-12 and 14-23 as follows. Please cancel claim 13 without prejudice or disclaimer.

1. (Currently Amended) ~~A communication system for transferring data between a transmitter and a receiver over a plurality of channels, the communication system~~ An apparatus comprising:

bit rate selecting circuitry configured to select a data rate for transferring data between the apparatus and a further apparatus over a plurality of channels;

modulation circuitry having a plurality of modulation alphabets providing a set of bit loading sequences;

circuitry configured to determine a power allocation for at least one bit loading sequence based on minimizing an error rate for the data rate; and

circuitry configured to select a bit loading sequence from the set of bit loading sequences with a lowest error rate for the data rate.

2. (Currently Amended) ~~The communication system~~ apparatus according to claim 1, wherein the plurality of channels comprises independent logical channels decomposed from a Multiple-Input, Multiple-Output channel.

3. (Currently Amended) The ~~communication system~~apparatus according to claim 1, wherein the plurality of channels comprises independent logical channels decomposed from an orthogonal frequency division multiplexing channel.

4. (Currently Amended) The ~~communication system~~apparatus according to claim 1, wherein the plurality of modulation alphabets is capable of representing data using a different number of bits.

5. (Currently Amended) The ~~communication system~~apparatus according to claim 4, wherein for a ~~fixed~~the data rate a set of bit loading sequences is identified which specify a number of bits to be loaded on at least one channel of the plurality of channels.

6. (Currently Amended) The ~~communication system~~apparatus according to claim 5, wherein the fixed data rate is selected based on a channel quality indicator.

7. (Currently Amended) The ~~communication system~~apparatus according to claim 6, wherein the channel quality indicator is calculated at the ~~transmitter~~apparatus.

8. (Currently Amended) The ~~communication system~~apparatus according to claim 6, wherein the channel quality indicator is calculated at the ~~receiver~~further apparatus.

9. (Currently Amended) The ~~communication system~~ apparatus according to claim 1, wherein the determined power allocation provides a power weighting for at least one channel of the plurality of channels.

10. (Currently Amended) The ~~communication system~~ apparatus according to claim 9, wherein if an identical modulation alphabet is used for at least two logical channels then a greater power weighting is allocated to weaker logical channels.

11. (Currently Amended) The ~~communication system~~ apparatus according to claim 1, wherein a power allocation used to transfer the data comprises the power allocation determined for the at least one bit loading sequence.

12. (Currently Amended) The ~~communication system~~ apparatus according to claim 1, wherein the ~~transmitter~~ apparatus comprises a plurality of transmitting antennas.

Claim 13. (Canceled)

14. (Currently Amended) The ~~communication system~~ apparatus according to claim 1, further comprising coding circuitry for adding parity bits to system bits and for distinguishing between the parity bits and the system bits.

15. (Currently Amended) The ~~communication system~~ apparatus according to claim 14, wherein the parity bits are transferred on a weak channel.

16. (Currently Amended) The ~~communication system~~ apparatus according to claim 14, wherein for a bit loading sequence having an identical modulation alphabet on at least two channels of the plurality of channels, the parity bits are transferred on at least one of a weakest channel and the power allocation is reduced.

17. (Currently Amended) ~~A system~~ The apparatus according to claim 14, wherein for a bit loading sequence having different modulation alphabets on the plurality of channels, the parity bits are transferred in a least significant bits of a modulation alphabet used on a strong channel.

18. (Currently Amended) ~~A method for transferring data between a transmitter and receiver over a communication channel, the method comprising:~~

selecting a data rate for transferring data between an apparatus and a further apparatus over a plurality of channels;

identifying a set of bit loading sequences from a plurality of modulation alphabets;

determining a power allocation for at least one bit loading sequence based on minimizing an error rate for the data rate; and

selecting a bit loading sequence from the set of bit loading sequences with a lowest error rate for the data rate and applying the power allocation to at least one communication channel.

19. (Currently Amended) ~~An apparatus communication system for transferring data between a transmitter and receiver over a communication channel, the system comprising:~~

~~a—first circuitry configured to decompose means for decomposing—a~~  
communication channel between the apparatus and a further apparatus into a plurality of logical channels;

bit rate selecting circuitry configured to select a data rate for transferring over the communication channel;

modulation circuitry having a plurality of modulation alphabets, wherein at least two modulation alphabets are ~~capable of representing~~configured to represent data using a different number of bits so that for the selected~~a fixed~~ data rate a set of bit loading sequences is identified which specify a number of bits to be loaded onto corresponding logical channels;

~~a—second circuitry means for allocating~~configured to allocate a power weighting to the corresponding logical channels for minimizing a bit error rate of the identified bit loading sequences for the data rate; and

~~a third circuitry for choosing~~configured to choose a bit loading sequence from the set of bit loading sequences having a minimum bit error rate for the data rate.

20. (Currently Amended) A method ~~for transferring data between a transmitter and receiver over a communication channel, the method comprising:~~

selecting a data rate for transferring data between an apparatus and a further apparatus over a communication channel;

decomposing ~~a the~~ communication channel into a plurality of logical channels;

selecting from a plurality of modulation alphabets, wherein at least two modulation alphabets for modulating data are ~~capable of representing~~configured to represent the data using a different number of bits;

identifying a set of bit loading sequences for ~~the selected a fixed~~ data rate which specify a number of bits to be loaded onto corresponding logical channels of the plurality of channels;

allocating a power weighting to the corresponding logical channel for minimizing a bit error rate of corresponding bit loading sequences from the set of bit loading sequences for the data rate; and

choosing a bit loading sequence from the set of bit loading sequences having a minimum bit error rate for the data rate.

21. (Currently Amended) A ~~The~~ method according to claim 20, wherein the data to be transferred comprises systematic bits and parity bits, and wherein the parity bits are loaded onto weaker logical channels.

22. (Currently Amended) An apparatus ~~communication system for transferring data between a transmitter and receiver over a communication channel, the system comprising:~~

rate selecting means for selecting a data rate for transferring data over the communication channel;

decomposing means for decomposing a communication channel into a plurality of logical channels;

representing means for representing data using a different number of bits so that ~~for a fixed~~ the selected data rate a set of bit loading sequences is identified which specify a number of bits to be loaded onto corresponding logical channels;

allocating means for allocating a power weighting to the corresponding logical channels for minimizing a bit error rate of the identified bit loading sequences for the data rate; and

choosing means for choosing a bit loading sequence from the set of bit loading sequences having a minimum bit error rate for the data rate.

23. (Currently Amended) ~~An apparatus communication system for transferring data between a transmitter and a receiver over a plurality of channels, the communication system comprising:~~

selecting means for selecting a data rate for transferring data between an apparatus and a further apparatus;

providing means for providing a modulation circuitry having a plurality of modulation alphabets and for providing a set of bit loading sequences;

determining means for determining a power allocation for at least one bit loading sequence based on minimizing an error rate for the data rate; and

selecting means for selecting a bit loading sequence from the set of bit loading sequences with a lowest error rate for the data rate.